

What is Claimed is:

1. A method for verifying that two programs are equivalent, the method comprising the steps of:

executing a first program;

collecting a first set of events that are created by the first program while it is being executed;

executing a second program;

collecting a second set of events that are created by the second program while it is being executed;

determining if the first set of events is equivalent to the second set of events by reconciling the first set of events and the second set of events; and

indicating the first program is not equivalent to the second program if an unreconciled event is discovered during the step of determining.

2. The method of Claim 1, wherein the step of determining comprises the steps of:

matching each event of the first set of events to a corresponding event in the second set of events;

declaring the existence of an unreconciled event if an event in the first set of events does not have a corresponding event in the second set of events; and

declaring the existence of an unreconciled event if an event in the second set of events does not have a corresponding event in the first set of events.

3. The method of Claim 2, wherein:

the step of collecting a first set of events comprises developing a logical state for each event of the first set of events;

the step of collecting a second set of events comprises developing a logical state for each event of the second set of events; and

the step of matching comprises comparing the logical state of each event of the first set of events to the logical state of the corresponding event in the second set of events.

4. The method of Claim 1, wherein the steps of executing a first program, collecting a first set of events, executing a second program, collecting a second set of events, and determining are performed in an iterative manner such that:

5 after executing the first program and collecting a first event, execution of the first program is halted;

the steps of executing the second program, collecting the second set of events, and determining are performed until an event in the second set of events is found that corresponds to the first event collected;

10 the steps of executing the first program, collecting a first set of events, and determining are performed until events in the first set of events are found that correspond to all events in the second set of events and at least one event remains in the first set of events; and

15 the steps of executing the second program, collecting a second set of events, and determining are performed until events in the second set of events are found that correspond to each event in the first set of events.

5. The method of Claim 4, wherein:

20 the step of collecting a first event comprises developing a logical state for the first event;

the step of collecting a second set of events comprises developing a logical state for each event of the second set of events;

the step of collecting a first set of events comprises developing a logical state for each event of the first set of events; and

25 the step of determining comprises comparing the logical state of each event of the first set of events to the logical state of the corresponding event in the second set of events or comparing the logical state of each event of the second set of events to the logical state of the corresponding event in the first set of events.

30 6. The method of Claim 1, wherein the step of indicating comprises activating the debugging capability in the software development system executing a first program at

the point where the unreconciled event is discovered and activating the debugging capability in the software development system executing a second program at the point where the unreconciled event is discovered.

5 7. The method of Claim 4, wherein the step of indicating comprises activating the debugging capability in the software development system executing a first program at the point where the unreconciled event is discovered and activating the debugging capability in the software development system executing a second program at the point where the unreconciled event is discovered.

10 8. The method of Claim 1, wherein:
the steps of collecting a first set of events and collecting a second set of events comprise treating references to address registers in instructions as symbols; and
the step of determining comprises computing the effective addresses of the
15 analogous references in the first set of event and the second set of events when reconciling the first set of events and the second set of events.

20 9. The method of Claim 4, wherein:
the steps of collecting a first set of events and collecting a second set of events comprise treating references to address registers in instructions as symbols; and
the step of determining comprises computing the effective addresses of the
analogous references in the first set of event and the second set of events when reconciling the first set of events and the second set of events.

25 10. The method of Claim 1 wherein the steps of collecting a first set of events and collecting a second set of events comprise:
determining that a first instruction is in the instruction pipeline;
calculating the current effective address delay of the instruction in the pipeline;
finding that a valid effective address for the instruction is available based on the
30 current effective address delay of the instruction;

computing the effective address of the first instruction if a valid effective address is not available; and
reporting the effective address of the instruction.

5 11. The method of Claim 4 wherein the steps of collecting a first set of events and collecting a second set of events comprise:

determining that a first instruction is in the instruction pipeline;

calculating the current effective address delay of the instruction in the pipeline;

10 finding that a valid effective address for the instruction is available based on the current effective address delay of the instruction;

computing the effective address of the first instruction if a valid effective address is not available; and

reporting the effective address of the instruction.

15 12. The method of Claim 11 wherein:

the step of calculating comprises subtracting the number of clock cycles that have occurred since the instruction entered the pipeline from the number of clock cycles required to compute the effective address of the instruction;

20 the step of finding comprises determining that the current effective address delay is 0; and

the step of computing is executed if the current effective address delay is less than 0.

25 13. The method of Claim 1, wherein the means for executing, collecting, determining, and indicating is a first verification program whereby the verification program causes a first program to be executed by a first software development system, causes a second program to be executed by a second software development system, and receives information from the first software development system and the second software development system to perform the steps of collecting, determining, and indicating.

30 14. The method of Claim 4, wherein the means for executing, collecting, determining, and indicating is a first verification program whereby the verification program

causes a first program to be executed by a first software development system, causes a second program to be executed by a second software development system, and receives information from the first software development system and the second software development system to perform the steps of collecting, determining, and indicating.

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15. A digital system, comprising:

a microprocessor having a first architecture for executing application programs;

a memory circuit connected to the microprocessor holding a first or target application program for execution by the microprocessor; and

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wherein the first or target application program was ported from another microprocessor and verified using a method for verifying that the first or target application program was equivalent to the original or source application program, the method comprising the steps of:

executing a first program;

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collecting a first set of events that are performed by the first program while it is being executed;

executing a second program;

collecting a second set of events that are performed by the second program while it is being executed;

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determining if the first set of events is equivalent to the second set of events; and

indicating the first program is not equivalent to the second program if a mismatch is discovered during the step of determining.

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16. The digital system of claim 15. wherein the steps of executing a first program, collecting a first set of events, executing a second program, collecting a second set of events, and determining are performed in an iterative manner such that:

after executing the first program and collecting a first event, execution of the first program is halted;

the steps of executing the second program, collecting the second set of events, and determining are performed until an event in the second set of events is found that corresponds to the first event collected;

5 the steps of executing the first program, collecting a first set of events, and determining are performed until events in the first set of events are found that correspond to all events in the second set of events and at least one event remains in the first set of events; and

10 the steps of executing the second program, collecting a second set of events, and determining are performed until events in the second set of events are found that correspond to each event in the first set of events.